EAST Browser - L1: (24) (foamed and... | JP 2002172710 A | tag: S | Doc: 4/24 | Format : FULL

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(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2002－172710
(P2002－172710A)
(43)公開日　平成14年6月18日(2002.6.18)

(51)Int.Cl.'	識別記号	FI		テーマコード(参考)
B29D 31/00		B29D 31/00		2H032
B29C 67/20		B29C 67/20	P	2H034
F16C 13/00		F16C 13/00	E	2H077
G03G 15/08	501	G03G 15/08	501D	3J103
15/16	103	15/16	103	4F212

審査請求 未請求　請求項の数8　OL　(全 7 頁)　最終頁に続く

(21)出願番号　特願2000－369976(P2000－369976)

(22)出願日　平成12年12月5日(2000.12.5)

(71)出願人　000006278
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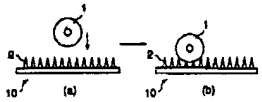
弁理士　大谷　保

最終頁に続く

(54)【発明の名称】　発泡体ローラの製造方法及び画像形成装置

(57)【要約】
【課題】　表面にスキン層を有する発泡体ローラを加工し、特に画像形成装置に用いられるトナー供給ローラとして好適な、トナー供給性能に優れ、安定してトナーを供給し得る発泡体ローラの製造方法を提供すること。
【解決手段】　回転軸と、その外周に設けられ、かつ表面にスキン層を有する発泡弾性体層からなるローラを、多数の針を具備した治具に浸漬させ、該針により、上記発泡弾性体層表面のスキン層を全周にわたり均質に穿孔する。



Details | Text | Image | HTML | Full

TITLE: METHOD FOR MANUFACTURING FOAMED ROLLER AND IMAGE FORMING...

PUBN-DATE: June 18, 2002

INVENTOR-INFORMATION:

NAME	COUNTRY
MIYAZAKI, KENICHI	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
BRIDGESTONE CORP	N/A

APPL-NO: JP2000369976

APPL-DATE: December 5, 2000

INT-CL (IPC): B29D031/00;B29C067/20 ;F16C013/00 ;G03G015/08 ;G03G015/16 ;G03G021/10

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a method for manufacturing a foamed roller suitable as a toner supply roller used particularly for an image forming apparatus, by processing the roller having a skin layer on its surface, having an excellent toner supply performance, and being capable of stably supplying a toner.

SOLUTION: The method for manufacturing the foamed roller comprises the steps of contacting the roller having a rotational shaft and a foamed elastic layer provided on its outer periphery and having the skin layer on a surface with a jig having many needles, and homogeneously entirely circumferentially perforating the skin layer on the surface of the elastic layer by the needles.

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Details | Text | Image | HTML | FULL

	1	U	Current	Current X	Pa	Document I	Title
1	☐	☐	399/53	399/272	14	US 6341204	Development apparatus employing t
2	☐	☐	264/321	264/156;	4	US 3742110	METHOD OF SHAPING BRITTLE F
3	☐	☐			6	JP 2002172	METHOD FOR MANUFACTURING
4	☐	☐			7	JP 2002172	METHOD FOR MANUFACTURING
5	☐	☑				JP 2002166	METHOD FOR MANUFACTURING
6	☐	☑				JP 2002113	METHOD FOR MANUFACTURING
7	☐	☑				JP 2001121	METHOD OF MANUFACTURING E

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EAST Browser - L1: [24] (foamed and... | JP 2002172711 A | Tag: S | Doc: 3/24 | Format : FULL

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(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2002－172711
（P2002－172711A）
(43)公開日　平成14年6月18日（2002.6.18）

(51)Int.Cl.'	識別記号	FI		テーマコード'（参考）
B29D 31/00		B29D 31/00		2H003
B29C 67/20		B29C 67/20	P	2H032
F16C 13/00		F16C 13/00	E	2H034
			A	2H077
G03G 15/02	101	G03G 15/02	101	3F343

審査請求 未請求　請求項の数5　OL　（全 6 頁）　最終頁に続く

(21)出願番号　特願2000－370889(P2000－370889)
(22)出願日　平成12年12月6日(2000.12.6)

(71)出願人　000005278
株式会社ブリヂストン
東京都中央区京橋1丁目10番1号
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神奈川県横浜市戸塚区柏尾町1番地　株式会社ブリヂストン横浜工場内
(72)発明者　高橋　渉
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(74)代理人　100078732
弁理士　大谷　保

最終頁に続く

(54)【発明の名称】　発泡体ローラの製造方法及び画像形成装置

(57)【要約】
【課題】　表面にスキン層を有する発泡体ローラの該スキン層を簡単な方法で消滅させ、画像形成装置に用いられるトナー供給ローラなどとして有用なスキン層のない発泡体ローラを効率よく製造する方法を提供すること。
【解決手段】　回転軸と、その外周に設けられ、かつ表面にスキン層を有する発泡弾性体層からなるローラの該スキン層を、非接触方式の熱処理により溶融消滅させる。

Details | Text | Image | HTML | Full

TITLE: METHOD FOR MANUFACTURING FOAMED ROLLER AND IMAGE FORMING

PUBN-DATE: June 18, 2002

INVENTOR-INFORMATION:

NAME	COUNTRY
ACHIHA, KOJI	N/A
TAKAHASHI, WATARU	N/A
KUSANO, AKIRA	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
BRIDGESTONE CORP	N/A

APPL-NO: JP2000370889

APPL-DATE: December 6, 2000

INT-CL (IPC): B29D031/00;B29C067/20 ;F16C013/00 ;G03G015/02 ;G03G015/08 ;G03G015/16 ;G03G021/10 ;B65H003/06

ABSTRACT:

PROBLEM TO BE SOLVED: To provide a method for efficiently manufacturing a foamed roller having no useful skin layer as a toner supply roller or the like used for an image forming apparatus, by disappearing the skin layer of the roller having the skin layer on its surface by a simple method.

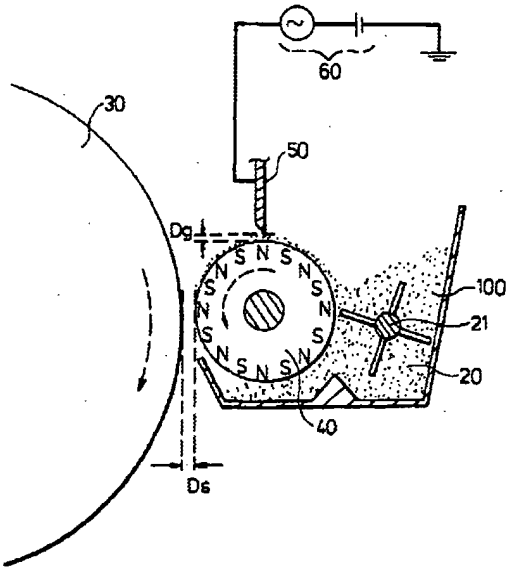
SOLUTION: The method for manufacturing the foamed roller comprises the step of heat treating in a non-contact type the skin layer of the roller having a rotational shaft and a foamed elastic layer provided on its outer periphery and including the skin layer on the surface to melt to disappear the skin layer.

Details | Text | Image | HTML | FULL

	1	U	Current	Current X	Pa	Document I	Title
1	☐	☐	399/53	399/272	14	US 6341204	Development apparatus employing t
2	☐	☐	264/321	264/156;	4	US 3742110	METHOD OF SHAPING BRITTLE F
3	☐	☐			6	JP 2002172	METHOD FOR MANUFACTURING
4	☐	☑				JP 2002172	METHOD FOR MANUFACTURING
5	☐	☑				JP 2002166	METHOD FOR MANUFACTURING
6	☐	☑				JP 2002113	METHOD FOR MANUFACTURING
7	☐	☑				JP 2001121	METHOD OF MANUFACTURING E

Details | Text | Image | HTML

FIG. 2



US-PAT-NO: 5565966

DOCUMENT-IDENTIFIER: US 5565966 A

TITLE: Image forming method for setting a developing gap

------ KWIC ------

The sleeveless magnet roller 40 to be used in the present invention is obtained by kneading a raw material in which magnetic powder (e.g., ferrite powder or ferromagnetic powder of rare earth magnets), sulphur, and vulcanization accelerator, further conductive agents (e.g., carbon black and carbon fiber) according to the need, are added to a rubber material (e.g., urethane rubber, silicone rubber, and butyl rubber), followed by casting, vulcanization, outer grinding, and magnetizing. In addition, for the present invention, an isotropic magnet roller is also available which is made up by projecting or extruding a kneaded material mainly comprising thermoplastic resin (polyamide, ethylene vinyl acetate copolymer, ethylene ethyl acrylate copolymer, or the like) and magnetic power (preferably 50 to 90 wt %).

The sleeveless magnet roller 40 to be used in the embodiment 2 is a magnet roller with 32 poles symmetrically fitted, obtained by kneading and projecting a compound in which a 90:10 ratio of isotropic Ba ferrite powder as magnetic power and nylon-6 are mixed, whose surface magnetic flux density is 200G. Besides nylon resin mentioned above, polyurethane resin, ethylene ethyl acrylate resin and the like, or plastic having some elasticity to exert no stress on toner may be employed as resin for the sleeveless magnet roller 40.

	1	U	Current	Current X	Pa	Document I	Title
6			430/55	399/130;	9	US 5879846	Image forming process and apparat
7			430/125	399/359;	30	US 5849453	Image forming method including rec
9			430/102	430/111.4;	28	US 5888622	Developing method
9			399/267	399/272;	8	US 5634182	Method of developing electrostatic l
10			430/108.	430/109.4;	8	US 5622802	Toner for electrostatic latent image c
11			399/176	399/149;	27	US 5587774	Cleanerless electrographic imaging
12			399/274	399/270;	10	US 5565966	Image forming method for setting a

US005655197A

United States Patent [19]

Okada et al.

[11] Patent Number: 5,655,197

[45] Date of Patent: Aug. 5, 1997

[54] DEVELOPING DEVICE

[75] Inventors: Hideki Okada; Yoshito Koga; Takashi Suzuki; Yoshihiro Nakashima; Takehiko Okamura, all of Nagano, Japan

[73] Assignee: Seiko Epson Corporation, Tokyo, Japan

[21] Appl. No.: 847,898

[22] Filed: Oct. 24, 1988

Related U.S. Application Data

[62] Division of Ser. No. 70,198, Jun. 2, 1993, Pat. No. 5,597, 063.

[30] Foreign Application Priority Data

Jun. 2, 1992 [JP] Japan 4-141424
May 11, 1993 [JP] Japan 5-109028

[51] Int. Cl.[6] G03G 15/06

[52] U.S. Cl. 118/651; 355/259

[58] Field of Search 355/245, 259, 355/261; 118/651, 653, 661

[56] References Cited

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0 387 096	9/1990	European Pat. Off. .
0 390 025	10/1990	European Pat. Off. .
0 400 572	12/1990	European Pat. Off. .
0 442 472	8/1991	European Pat. Off. .
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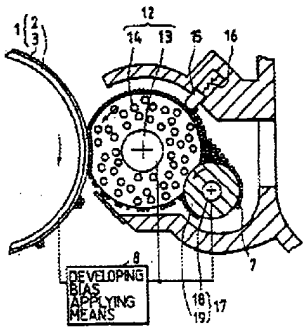
59-231560	12/1984	Japan .
60-218973	9/1987	Japan 355/259
1756436	1/1987	U.S.S.R. .
1351614	5/1974	United Kingdom .
2 163 571	2/1986	United Kingdom .
2 197 227	5/1988	United Kingdom .

Primary Examiner—Robert Beatty
Attorney, Agent, or Firm—Sughrue, Mion, Zinn, Macpeak & Seas

[57] ABSTRACT

A developing device including a supply member resiliingly contacted with a toner carrier, wherein the supply member has a hardness which greater than that of the toner carrier. The supply member is rotated in the same direction as the toner carrier to conduct the pasting and supply of toner. A plate spring-like regulation member is pressed against the toner carrier to charge the toner to a predetermined polarity and thin the toner into one or two layers. The toner carrier is made of a foam material.

30 Claims, 6 Drawing Sheets



charge control agent include a metallic complex salt, and a quaternary ammonium salt.

Detailed Description Text - DETX (21):

FIG. 6 is a diagram of a developing device which is another embodiment of the invention. A blade-like or cylindrical regulation member 15 made of a non-magnetic or magnetic metal or a resin is urged by press means 16 using an elastic body such as a spring or rubber, against a toner carrier 12 for carrying toner 7. This causes the regulation member 15 to be elastically deformed so that, at the contacting area of the toner carrier 12, the toner 7 is triboelectrically charged to have a predetermined polarity, and thinned so that one or two toner layers are formed. At least the surface of the toner carrier 12 is formed by a foamed member having a hardness of 40 degree. (JIS A) or less. When pressed by a rigid body, the toner carrier 12 is easily deformed. Similarly, when the toner carrier 12 is formed by a foamed member having a hardness of 40 degree. (JIS A) or less, a development nip length of 1 mm or longer can be obtained even in the case of a low developing pressure of 5 gf/mm or less, thereby allowing the soft contact developing process to be stably conducted. The toner carrier 12 comprises a foamed member 14 which is formed on the outer surface of a shaft 13 made of a metal or resin and which has foam cells of several tens to one thousand microns. In the embodiment, the foamed member 14 is formed by a polyurethane foam. Alternatively, the foamed member 14 may be made of another foam in the same manner as the foamed member 28 of the supply member 26 described above. A supply member 17 comprises a cylindrical solid member 19 made of a metal, resin or hard rubber and formed on the outer surface of a shaft 18 made of a metal or resin. The surface roughness of the supply member 17 is several tens microns.

Current US Original Classification - CCOR (1):

399/281

Current US Cross Reference Classification - CCXR (1):

	Current X	Pa	Document	Title
1	399/286	26	US 5655197	Developing device
2	399/285	26	US 5557060	Developing device
3	492/53	20	US 5424815	Developing device

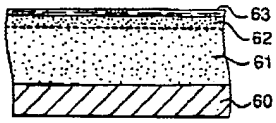


FIG.6 (a)

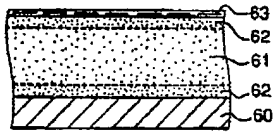


FIG.6 (b)

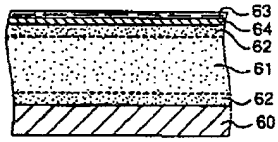


FIG.6 (c)

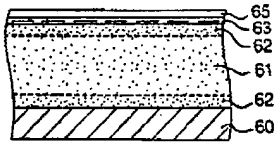


FIG.6 (d)

-------- KWIC --------

Detailed Description Text - DETX (14):

FIG. 6(a) is a schematic cross-sectional view of an embodiment of the developing device according to the present invention wherein a magnetic field generating layer is provided on the surface of a toner carrier. In this embodiment, a foam portion 61 and a solid surface layer portion 62 are provided in that order on a base 60, such as a shaft, and a magnetic field generating layer 63 is provided on the solid surface layer portion 62. When the magnetic field generating layer 63 is provided on the outer periphery of the toner carrier in this manner, the magnetic toner can be held on the toner carrier by means of magnetic force and stably transported, so that the scattering of the toner can be prevented. Further, at the time of the development, the occurrence of fogging can be reduced through the generation of the development inhibitory force by the magnetic force against the developing force by the developing electric field. Further, it is also possible to attain a development electrode effect by making the magnetic field generating layer 63 electroconductive. The thickness of the magnetic field generating layer 63 is preferably 100 .mu.m or less from the viewpoint of ensuring ample flexibility. With respect to the material for the magnetic field generating layer 63, the dispersion of a ferromagnetic fine powder in substantially the same resin as that in the foam portion 61 contributes to an improvement in the bonding strength between the solid surface layer portion 62 and the magnetic field generating layer 63. An even layer can be formed as the magnetic field generating layer 63 through the use of spray coating, transfer coating, in-mold coating, roller coating, electroless plating or the like. The ferromagnetic material for the magnetic field generating layer 63 may be any material known as a magnetic recording material and a magnetic material. Specific examples thereof include a magnetic material containing at least one element selected from Fe, Ni, Co, Mn and Cr, for example, .gamma.-Fe.sub.2 O.sub.3, Ba-Fe, Ni-Co, Co-Cr and Mn-Al. The demagnetization of the magnetic field generating layer 63 caused by a magnetic toner and a magnetically soft component around the developing device can be prevented by applying a coercive force of 2000 Oe or more.

	Current X	Pa	Document I	Title
1	399/286	26	US 5655197	Developing device
2	399/285	26	US 5557060	Developing device
3	492/53	20	US 5424815	Developing device

US006324372B1

(12) **United States Patent**
Hirota

(10) **Patent No.: US 6,324,372 B1**
(45) **Date of Patent: Nov. 27, 2001**

(54) **MAGNET ROLLER, PROCESS FOR PRODUCING SAME AND DEVELOPING UNIT USING SAME**

(75) Inventor: **Kazunori Hirota, Kanagawa-ken (JP)**

(73) Assignee: **Bridgestone Corporation, Tokyo (JP)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No: **09/556,591**

(22) Filed: **Apr. 20, 2000**

(30) **Foreign Application Priority Data**

Apr. 27, 1999 (JP) 11-119908

(51) Int. Cl.[7] G03G 15/09

(52) U.S. Cl. 399/277

(58) **Field of Search** 399/277, 257, 399/279, 286; 492/6, 15; 428/36.8, 35.92, 29/895

(56) **References Cited**

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06-162219 * 6/1994 (JP).
08-162225 * 6/1996 (JP).

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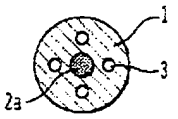
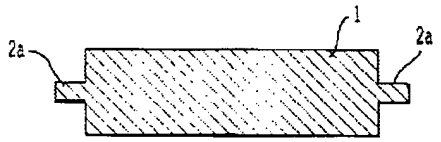
Primary Examiner—Arthur T. Grimley
Assistant Examiner—Hoan Tran
(74) *Attorney, Agent, or Firm*—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

(57) **ABSTRACT**

There are disclosed a magnet roller which includes a magnet main body portion and a shaft portion, wherein the magnet main body portion includes a composition for magnets and has at least one hollow portion in the inside thereof, a process for producing a magnet roller having a magnet main body portion and a shaft portion, which includes arranging in advance, at least one member for forming a hollow portion in a cavity of a mold which has generated a magnetic field on the circumference of the cavity, pouring a composition for magnets into the mold, and thereafter withdrawing the member for forming the hollow portion so that at least one hollow portion is formed in the inside of the magnet roller; and a developing unit which includes a developing roller constituted of a sleeve installed in a freely rotatable manner and the above magnet roller installed inside the sleeve. The magnet roller can be produced at a low cost owing to curtailed use quantity of a composition for magnets, can suppress the lowering of magnetic force due to voids on the outside periphery thereof, and is favorably employed, for instance, in image forming equipment such as copying machinery, printers and facsimile machinery.

11 Claims, 1 Drawing Sheet





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US-PAT-NO: 6324372

DOCUMENT-IDENTIFIER: US 6324372 B1

TITLE: Magnet roller, process for producing same and developing unit using same

-------- KWIC --------

In regard to a process for producing such a magnet roller, there is prevailingly employed a process which comprises molding a magnet main body portion by injection molding or extrusion molding of a composition for magnets in which magnetic powders are mixed with a thermoplastic resin binder composed principally of nylon or polypropylene, by the use of a mold which has generated a magnetic field on the circumference of a cavity thereof to mold the composition into the form of a roller and magnetize to desired magnetic force characteristics.

399/277

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	1	U	Current	Current X	Pa	Document I	Title
1	☐	☐	252/62.5	252/62.55;	7	US 6342167	Synthetic resin magnet composition
2	☑	☐	399/277		6	US 6324372	Magnet roller, process for producing
3	☐	☐	399/104		17	US 6160976	Developing device having magnetic
4	☐	☐	399/104	399/106	9	US 6151467	Developing apparatus
5	☐	☐	399/277	335/296;	15	US 6021286	Magnet roller and manufacturing met
6	☐	☐	399/277	492/18;	7	US 5946535	Magnet roller and developing roller u
7	☐	☐	335/284	399/277	9	US 5659280	Apparatus and system for magnetize

Details | Text | Image | HTML

pulverizing the cooled product to obtain a pulverized product; and classifying the pulverized product to obtain magnetic toner particles; wherein;

the mixture is melt-kneaded under conditions of:

[illegible]

wherein ω represents a screw rotational speed (m/min), T represents a preset temperature (K), F represents a feed rate (kg/min) of the mixture, D represents a cylinder inner diameter (m), L represents a screw effective length (m), π represents the circular constant, and k represents $(D_0/D)^2$, where D_0 is 0.1 m;

the magnetic toner particles have a weight-average particle diameter of from 3.5 to 6.5 μm; and a dispersion prepared by dispersing 15 mg of the magnetic toner particles in 19 ml of a mixed solution of ethyl alcohol and water in a volume ratio of 27:73 has an absorbance of from 0.2 to 0.7 at a wavelength of 600 nm.

The present invention still also provides an image forming method comprising electrostatically charging an electrostatic image bearing member by a contact charging means to which a bias is applied; subjecting the electrostatic image bearing member thus charged, to exposure to form an electrostatic image; and developing the electrostatic image by a developing means having a magnetic toner to form a magnetic toner image;

the magnetic toner comprising magnetic toner particles containing at least a binder resin, a magnetic fine powder and a wax; wherein;

the magnetic toner particles have a weight-average particle diameter of from 3.5 to 6.5 μm; and a dispersion prepared by dispersing 15 mg of the magnetic toner particles in 19 ml of a mixed solution of ethyl alcohol and water in a volume ratio of 27:73 has an absorbance of from 0.2 to 0.7 at a wavelength of 600 nm.

The present invention further provides a process cartridge comprising an electrostatic image bearing member, a contact charging means for electrostatically charging the electrostatic image bearing member, and a developing means holding a magnetic toner;

the magnetic toner comprising magnetic toner particles containing at least a binder resin, a magnetic fine powder and a wax; wherein;

the magnetic toner particles have a weight-average particle diameter of from 3.5 to 6.5 μm; and a dispersion prepared by dispersing 15 mg of the magnetic toner particles in 19 ml of a mixed solution of ethyl alcohol and water in a volume ratio of 27:73 has an absorbance of from 0.2 to 0.7 at a wavelength of 600 nm.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic illustration of the constitution of a temperature control unit and a screw of a kneader.

FIG. 2 is a cross-sectional schematic illustration of the constitution of a cylinder.

FIG. 3 shows a correlation between the resin temperature, the quantity of free magnetic fine particles and the dispersibility of wax.

FIG. 4 is a schematic illustration of an example of an electrophotographic apparatus employing the magnetic toner of the present invention.

FIG. 5 is a schematic illustration of a contact charging means preferably used in the present invention.

FIG. 6 is a schematic illustration of an example of the process cartridge of the present invention.

FIG. 7 is a schematic cross-sectional illustration of a gas stream classifier for the multi-divisional classification of magnetic toner particles, which utilizes the Coanda effect.

FIG. 8 is a perspective view of the main part of the gas stream classifier shown in FIG. 7.

FIG. 9 is a partial perspective view of the gas stream classifier shown in FIG. 7.

FIG. 10 is a cross section along line 10—10 in FIG. 7.

FIG. 11 illustrates the main part of the gas stream classifier shown in FIG. 7.

FIG. 12 illustrates an example of a classification process used in the classification of magnetic toner particles.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With regard to the contamination of the charging member which is a kind of contact charging means and the toner melt-adhesion to drum onto the surface of the photosensitive drum which is a kind of electrostatic image bearing member, some magnetic toners tend to cause these problems and some may hardly cause similar problems. Studies were made on how to simply find the difference between magnetic toner particles constituting the former toners and magnetic toner particles constituting the latter toners, without relying on the evaluation by image reproduction. As a result, it has been found that such difference can be detected by a method using a dispersion prepared by dispersing magnetic toner particles in a mixed solution of ethyl alcohol and water.

The fact that the dispersion has a high absorbance indicates that the magnetic toner particles stand readily wettable by the aqueous solution and that magnetic fine powder is present in a large quantity on the surfaces of the magnetic toner particles. Such magnetic toner particles tend to liberate magnetic fine particles from their surfaces. In fact, when magnetic toners produced from such magnetic toner particles are evaluated by image reproduction, such problems as charging roller contamination and melt-adhesion to photosensitive drum surface tend to occur. It has been ascertained that many magnetic fine particles are present in the contaminants on the charging roller surface and in the molten deposits on the photosensitive drum surface. This can be said to be a measuring method by which the quantity of magnetic fine powder present on the surfaces of the magnetic toner particles can be clearly and properly shown.

The magnetic toner particles used in the present invention have a weight-average particle diameter of from 3.5 to 6.5 μm, and a dispersion prepared by dispersing 15 mg of the magnetic toner particles in 19 ml of a mixed solution of ethyl alcohol and water (volume ratio: 27:73) has an absorbance of from 0.2 to 0.7 at a wavelength of 600 nm.

The weight-average particle diameter of the magnetic toner or magnetic toner particles is measured by a Coulter counter method.

As a device for measuring the average particle diameter of the magnetic toner particles and magnetic toner by the Coulter counter method, a Coulter counter Model TA-II or Coulter Multisizer (manufactured by Coulter Electronics, Inc.) is used. As an electrolytic solution, an aqueous 1% NaCl solution is prepared using first-grade sodium chloride. For example, ISOTON R-II (trade name, manufactured by Coulter Scientific Japan Co.) may be used. Measurement is carried out by adding as a dispersant 0.1 to 5 ml of a surface active agent, preferably an alkylbenzene sulfonate, to 100 to 150 ml of the above aqueous electrolytic solution, and further adding 2 to 20 mg of a sample to be measured. The electrolytic solution in which the sample has been suspended is subjected to dispersion for about 1 minute to about 3 minutes in an ultrasonic dispersion machine. The volume

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DOCUMENT-IDENTIFIER: US 6238834 B1

TITLE: Magnetic toner for developing electrostatic images, process for producing it, image forming method and process cartridge

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Detailed Description Paragraph Table - DETL (14):

TABLE 6 Image evaluation L/L H/H Form of contact Knead- Solid Morning Melt charging roller ing Ab- Magnetic black Charging 1st sh. adhesion Rubber condi- sorb- fine powder image roller image to layer Surface layer tions ance .sigma.r .times. Hc W .times. R density fog contamination density drum Example: 10 EPDM Nylon resin A 0.65 22 0.044 1.32 2.5 3 1.30 3 11 EPDM Nylon resin A 0.64 38 0.044 1.35 2.0 3 1.32 4 12 EPDM Nylon resin A 0.64 38 0.024 1.35 2.0 4 1.32 4 foam 13 EPDM Fluorine-cont. A 0.64 38 0.024 1.36 1.9 5 1.31 4 foam acrylic resin 14 EPDM Fluorine-cont. B 0.55 38 0.024 1.35 1.7 5 1.35 5 foam acrylic resin Comparative Example: 4 EPDM Nylon resin C 0.73 22 0.044 1.35 3.0 1 1.25 1 5 EPDM Nylon resin D 0.18 22 0.044 1.25 1.5 4 1.35 3 L/L: Low temperature/low humidity environment H/H: High temperature/high humidity environment

Current US Cross Reference Classification - CCXR (1):

399/111

	I	U	Current	Current X	Pa	Document I	Title
1	☐	☐	430/106	399/111;	31	US 6238834	Magnetic toner for developing electr
2	☐	☑	399/103	399/104	77	US 6185393	Developing apparatus, magnetic sea
3	☐	☑	399/277	399/276;	17	US 6125255	Magnet assembly with inserts and m
4	☐	☑	399/286		8	US 6058285	Gloss and image forming apparatus
5	☐	☑	310/12	399/208	21	US 5909066	Linear motor apparatus employing li
6	☐	☑	399/120	399/123;	14	US 5907752	Device for cleaning a photoconducti
7	☐	☑	399/281	399/286	26	US 5655197	Developing device

US005557060A

United States Patent [19]

Okada et al.

[11] Patent Number: 5,557,060

[45] Date of Patent: Sep. 17, 1996

[54] DEVELOPING DEVICE

[75] Inventors: Hideki Okada; Yoshiro Kaga; Takashi Suzuki; Yoshihiro Nakashima; Takahiko Okamura, all of Nagano, Japan

[73] Assignee: Seiko Epson Corporation, Tokyo, Japan

[21] Appl. No.: 70,188

[22] Filed: Jun. 3, 1993

[30] Foreign Application Priority Data

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May 11, 1993 [JP] Japan 5-126328

[51] Int. Cl.[6] G03G 15/06

[52] U.S. Cl. 118/651; 355/259

[58] Field of Search 355/259, 261; 118/651, 653

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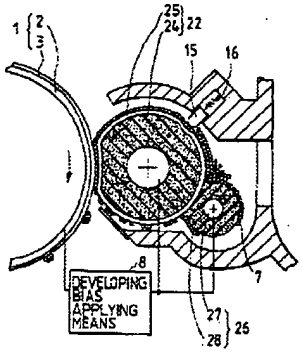
[57] ABSTRACT

A developing device including a supply member pressingly contacted with a toner carrier having a hardness which is greater than that of the supply member and smaller than a predetermined hardness. The supply member is rotated in the same direction as the toner carrier to conduct the removing and supply of toner. A plate spring-like regulation member is pressed against the toner carrier to charge the toner to a predetermined polarity and thin the toner into one or two layers.

6 Claims, 6 Drawing Sheets



Details Text Image HTML Full

US-PAT-NO: 5557060

DOCUMENT-IDENTIFIER: US 5557060 A

TITLE: Developing device

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Detailed Description Text - DETX (10):

FIG. 2 is a diagram showing another toner carrier 22. A blade-like or cylindrical regulation member 15 made of a non-magnetic or magnetic metal or a resin is urged by press means 16 using an elastic body such as a spring or rubber, against a toner carrier 22 for carrying toner 7. This causes the regulation member 15 to be elastically deformed so that, at the contacting area of the toner carrier 12, the toner 7 is triboelectrically charged to have a predetermined polarity, and thinned so that one or two toner layers are formed. A foamed member 24 having foam cells of several tens to one thousand microns is formed on the outer surface of a shaft 23 made of a metal or a resin. A flexible layer 25 having a thickness of several tens to several hundreds microns is formed on the outer surface of the foamed member 24. The configuration in which the toner carrier 22 is constructed by the foamed member 24 and the thin flexible layer 25 having a surface of a low expansivity so as to attain the rubber hardness of 40 deg. (JIS A) or less can reduce the friction load between the foamed member 24 and the foamed member constituting the supply member 26. Moreover, the configuration enables the development nip length to be 1 mm or longer even in the case of a low developing pressure of 5 g/mm or less, thereby allowing the soft pressure developing process to be stably conducted. In the embodiment, the foamed member 24 is made of a polyurethane foam. Alternatively, the foamed member 24 may be made of another foam in the same manner as the foamed member 28 constituting the above-mentioned supply member 26. Particularly, flexible foams such as polyethylene, polyurethane, silicone, and neoprene are suitable as the material of the foamed member 24. Among these materials, a polyurethane foam is excellent in moldability and has a high hydrophilic property, and therefore it

Details Text Image HTML KWIC

	Current X	Pa	Document I	Title
1	399/286	26	US 5655197	Developing device
2	399/285	26	US 5557060	Developing device
3	492/53	20	US 5424815	Developing device

Details Text Image HTML